REMARKS

Claims 1-30 remain in this application. Claims 3-5, 7-15, 18-20, 22-30 are withdrawn pending a decision of the Petition from Requirement of Restriction filed April 12, 2007.

Claim Rejections under 35 U.S.C. § 103

The Final Office Action rejected claims 1, 6, 16 and 21 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 7,065,327 to Macnally et al. (the Macnally reference) in view of US Published Patent Application 2005/0195113 to Candal (the Candal reference). However, there are clear errors in the rejection in that neither the Macnally reference nor the Candal reference, either alone or in combination, disclose or suggest the requirements of the claims. As such, a prima facie case of obviousness has not been made.

Independent Claim 1 and dependent claim 6

The Office Action has failed to provide a prima facie case of obviousness for independent claim 1 because it has not shown that the cited references disclose or suggests the element, *inter alia*, of claim 1 of, "an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode." As stated in paragraphs 35 and 36 of the specification:

> "The adjustable load 106 is adjusted based on an impedance selection signal 108 and is coupled to the low noise amplifier 72 and power amplifier 84. The adjustable load provides a 1st impedance based on the impedance selection signal 108 when the radio front-end is in a transmit mode (i.e., the power amplifier 84 is enabled and low noise amplifier 72 is disabled) and provides a 2nd impedance based on the impedance selection signal 108 when the radio front-end is in a receive mode (i.e., the power amplifier 84 is off and the low noise amplifier 72 is on) such that the impedance on the 1st winding is substantially similar in the transmit mode and in the receive mode of the radio. [0036] In operation, the

loading on the 2nd winding 104 varies depending on whether the power amplifier 84 is enabled or the low noise amplifier 72 is enabled. During a calibration function of the wireless communication device, the particular loading during the transmit and receive modes may be determined. Based on this determination, the impedance selection signal 108 may be generated to provide the desired loading of adjustable load 106 such that it provides a 1st load during transmit mode and a 2nd impedance during receive mode such that the load on the 2nd winding 104 remains substantially constant whether the radio is in a transmit mode or receive mode." Figure 3 is reproduced below as an illustration of one of the embodiments. Figures 1, 2 and 4 through 9 illustrate other embodiments of the invention as well.

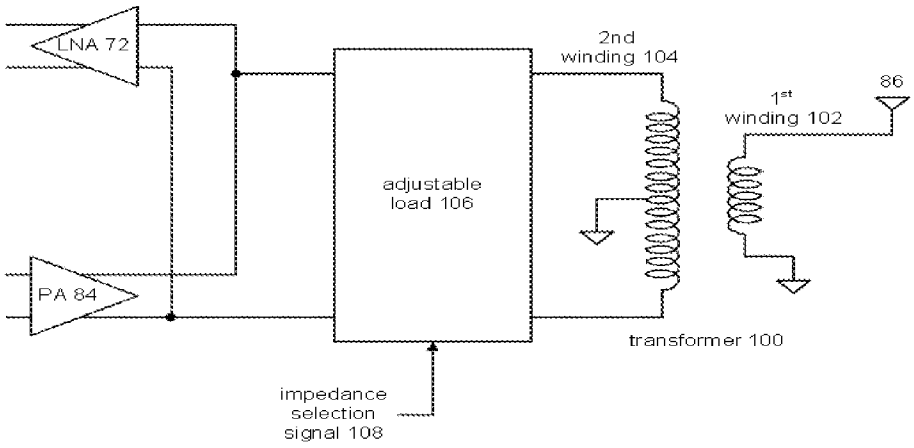

FIG. 3
radio front end 85

With respect to the Macnally reference, it actually teaches away from the present invention. The Macnally reference merely discloses at Column 5, lines 11 through 14 that the "Antenna Interface" in Figure 1 includes, "an ISM band filter 112, a balun 114, an RF matching network 116 . . .". The Office Action cites Figure 1 and column 5, lines 3 through 23 as

disclosing, "a transformer having a first winding and a second winding, wherein the first winding is operable coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier, and an adjustable load operable coupled to the second winding." However, the Macnally reference nowhere discloses an adjustable load coupled to the second winding or any type of impedance selection signal. In fact, it specifically states at Column 6, lines 51 through 56 that the LNA has a first impedance transformation network, seen in Figure 2, for receiving a signal while the power amplifier has a singly matched network associated with it for transmission of a signal, as seen in Figure 12. The Macnally reference states that time division duplex (TDD) ensures isolation between the transmitter 124 and the receiver 126 at column 5, lines 26-27. Because the Macnally reference teaches that the PA and LNA have different associated impedance networks for transmission and reception of a signal that are not adjustable and without any type of selection signal, it teaches away from and nowhere discloses the element, *inter alia*, of claim 1 of, "an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode."

With respect to the Candal reference, it fails to add to the teachings of the Macnally reference. The Candal reference discloses an antenna for a cellular telephone that may be moved from an extended to a retracted position with a similar impedance at the RF signal interface when the antenna is in both its retracted and extended positions. Paragraph 25 of the Candal reference states:

> "The RF signals are coupled to the antenna structure 142 at an RF signal interface that includes an impedance matching network 134. Impedance matching network 134 is designed to optimize the RF performance of the antenna structure over one or more RF bands in which the cellular phone 100 operates by maximizing the amount of RF energy that is transferred to and from the antenna structure 142. The design of the impedance matching networks in the exemplary embodiments

of the present invention is simplified by the operation of the antenna structure 142, which operates to provide substantially similar impedance at the RF signal interface when the antenna is in both its retracted and extended positions."

Further, as stated in paragraphs 35 and 36 of the Candal reference, the similar impedance at the RF signal interface is provided by different circuits due to different contact points of the RF signal interface in the retracted and extended positions of the antenna:

[0035] As described above, the impedance of the moveable antenna structure 142 is influenced by different components depending upon the position of the movable antenna element 124. When the moveable antenna element 124 is in the retracted position, the meander line element 118 is part of the RF circuit for the moveable antenna structure 142 and the radiation element 122 is not part of that RF circuit. When the moveable antenna structure 124 is moved to its extended position, the radiation element 122 is part of the RF circuit of the moveable antenna structure 142 and the meander line element 118 is not. The designs of the exemplary embodiments of the present invention, as described herein, illustrate exemplary switching techniques that are used to automatically create these different RF circuits based upon the position of the moveable antenna element. These different RF circuits, based upon the position of the moveable antenna element 124, are created in the above described embodiment by the operation of physical contact arrangements between the RF drive contact 138 and either the radiation element contact 130 or the meander line contact 106 through the conductive element 110, respectively.

[0036] The meander line 118 of the exemplary embodiments is designed so as to cause the moveable antenna structure 142 to exhibit, in the one or more bands that the cellular telephone operates, an RF impedance exhibited at the RF drive connector 138 that is substantially similar when the moveable antenna element 124 is in either its extended position or its retracted position. Maintaining this similar impedance advantageously optimizes antenna efficiency and RF energy

> transfer between the moveable antenna structure 142 and the matching network 134 when the moveable antenna element 124 is in either position."

Thus, the Candal reference merely discloses two different circuits connected to the RF drive connector 138 that provides substantially similar impedance when the moveable antenna element 124 is in either its extended position or its retracted position. The Office Action states that Candal reference teaches "a matching network configuration" and cites paragraph 23 of the Candal reference. However, paragraph 23 of the Candal reference provides no further description of a matching configuration. It states:

> [0023] It is to be noted that, as is well known in the RF antenna arts, antennas exhibit similar characteristics when employed in receiving and transmitting functions. The RF characteristics of antennas described herein, including but not limited to impedance as exhibited at interface, etc., are equivalent for either transmit or receive operations. It is to be further understood that an RF drive point for an antenna is able to be equally considered as an RF input or output point for that antenna. It is therefore to be understood that descriptions reciting one of transmit or receive operations for antennas within this specification apply equally to the other or both receive and transmit operations.

Thus, the Candal reference nowhere describes or suggests the element, *inter alia*, of claim 1 of, "an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode."

Finally, the Office Action has not shown how the combination of the Macnally and Candal reference suggest the claimed requirements. In fact, the combination teaches away from the claimed requirements by teaching different impedance networks and values for transmission and reception of signals and no description of an adjustable load or any type of impedance selection signal associated with an adjustable load such that impedance is substantially similar in

the transmit mode and in the receive mode. When evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Since the Office Action has failed to show how the Macnally reference and Candal reference teach or suggest all limitations of claim 1 or any of the claimed limitations of dependent claim 6, a prima facie case of obviousness has not been made.

Independent Claim 16 and dependent claim 21

The Office Action has failed to provide a prima facie case of obviousness for independent claim 16 because it has not shown that the cited references disclose or suggest the element, *inter alia*, of claim 16 of, "a radio front end includes . . . an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode."

With respect to the Macnally reference, it actually teaches away from the embodiment of claim 16. The Macnally reference merely discloses at Column 5, lines 11 through 14 that the "Antenna Interface" in Figure 1 includes, "an ISM band filter 112, a balun 114, an RF matching network 116 . . .". The Office Action cites Figure 1 and column 5, lines 3 through 23 as disclosing, "a transformer having a first winding and a second winding, wherein the first winding is operable coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier, and an adjustable load operable coupled to the second winding." However, the Macnally reference nowhere discloses an adjustable load coupled to the second winding or any type of impedance selection signal. In fact, it specifically states at Column 6, lines 51 through 56 that the LNA has a first impedance transformation network, seen in Figure 2, for receiving a signal while the power amplifier has a singly matched network associated with it for transmission of a signal, as seen in Figure 12. The Macnally reference states that time division duplex (TDD) ensures isolation between the transmitter 124 and the receiver 126 at column 5, lines 26-27. Because the Macnally reference teaches that the PA and LNA have different associated impedance networks for transmission and reception of a signal

that are not adjustable and without any type of selection signal, it teaches away from and nowhere discloses the element, *inter alia*, of claim 16 of, "a radio front end includes . . . an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode."

With respect to the Candal reference, it fails to add to the teachings of the Macnally reference. The Candal reference discloses an antenna for a cellular telephone that may be moved from an extended to a retracted position with a similar impedance at the RF signal interface when the antenna is in both its retracted and extended positions. Paragraph 25 of the Candal reference states:

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Further, as stated in paragraphs 35 and 36 of the Candal reference, the similar impedance at the RF signal interface is provided by different circuits due to different contact points of the RF signal interface in the retracted and extended positions of the antenna:

> [0035] As described above, the impedance of the moveable antenna structure 142 is influenced by different components depending upon the position of the movable antenna element 124. When the moveable antenna element 124 is in the retracted position, the meander line element 118 is part of the RF circuit for the

moveable antenna structure 142 and the radiation element 122 is not part of that RF circuit. When the moveable antenna structure 124 is moved to its extended position, the radiation element 122 is part of the RF circuit of the moveable antenna structure 142 and the meander line element 118 is not. The designs of the exemplary embodiments of the present invention, as described herein, illustrate exemplary switching techniques that are used to automatically create these different RF circuits based upon the position of the moveable antenna element. These different RF circuits, based upon the position of the moveable antenna element 124, are created in the above described embodiment by the operation of physical contact arrangements between the RF drive contact 138 and either the radiation element contact 130 or the meander line contact 106 through the conductive element 110, respectively.

[0036] The meander line 118 of the exemplary embodiments is designed so as to cause the moveable antenna structure 142 to exhibit, in the one or more bands that the cellular telephone operates, an RF impedance exhibited at the RF drive connector 138 that is substantially similar when the moveable antenna element 124 is in either its extended position or its retracted position. Maintaining this similar impedance advantageously optimizes antenna efficiency and RF energy transfer between the moveable antenna structure 142 and the matching network 134 when the moveable antenna element 124 is in either position."

Thus, the Candal reference merely discloses two different circuits connected to the RF drive connector 138 that provides substantially similar impedance when the moveable antenna element 124 is in either its extended position or its retracted position. The Office Action states that Candal reference teaches "a matching network configuration" and cites paragraph 23 of the Candal reference. However, paragraph 23 of the Candal reference provides no further description of a matching configuration. It states:

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Thus, the Candal reference nowhere describes or suggests the element, *inter alia*, of claim 16 of, "a radio front end includes . . . an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode."

Finally, the Office Action has not shown how the combination of the Macnally and Candal reference suggest the claimed requirements. In fact, the combination teaches away from the claimed requirements by teaching different impedance networks and values for transmission and reception of signals and no description of an adjustable load or any type of impedance selection signal associated with an adjustable load such that impedance is substantially similar in the transmit mode and in the receive mode. When evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Since the Office Action has failed to show how the Macnally reference and Candal reference teach or suggest all limitations of claim 16 or any of the claimed limitations of dependent claim 21, a prima facie case of obviousness has not been made.

CONCLUSION

For the above reasons, the foregoing amendment places the Application in condition for allowance. Therefore, it is respectfully requested that the rejection of the claims be withdrawn and full allowance granted. Should the Examiner have any further comments or suggestions, please contact Jessica Smith at (972) 240-5324.

Respectfully submitted,

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